The Secret Sounds of Music

The Mystery of Eric Clapton's Guitar

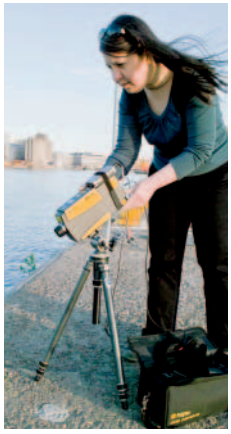
While conducting a Scanning Vibrometer training seminar at Swansea Metropolitan University, Polytec UK engineers and attending users took the opportunity to measure the vibration characteristics of one of Eric Clapton's famous acoustic guitars. The guitar was completely characterized with regard to frequencies and deflection shapes. However, the secret of Clapton's genius was not revealed.

Musical instruments generate wonderful, inspiring sounds through their vibrations. Polytec vibrometers can help us to discover the secrets behind these sounds, with early work already done on violins, cembalos and dulcimers. Even "secret sounds" can be unveiled through testing with this technology. Read on to learn about some of the recent applications including guitars, pipe organs and steelpans. www.polytec.com/acoustics

Polytec sponsors Research on "Secret Sounds"

For their long-term project titled "Unveiled Presence" (secret sounds), the media artists, Natalie Bewernitz and Marek Goldowski, are exploring characteristic sounds and acoustic properties of the city of Helsinki. During the month of May, they used a PDV-100 Portable Vibrometer from Polytec to capture hidden vibrations of city objects and places through laser light. As a first step, the artists arranged the data into an audio-visual presentation at the Cartes Flux 2010 Festival in October 2010 at Helsinki.

http://cartes-art.fi/flux2010/?p=137



Comparative Material Testing of Organ Pipes

In Germany, organ pipes are generally made from a tin-lead alloy, whereas in the United States zinc is often used. To determine whether using zinc in Germany was appropriate, investigations were made into how the material used would influence the sound. Wall vibrations of tin-lead alloy and zinc organ pipes were measured by a 3-D Scanning Vibrometer and revealed significant differences in vibration properties. However, subsequent acoustic measurements showed that the pipes can be voiced to generate the same sound. The research results were clear – the "soft" zinc strip developed by the Grillo-Werke AG can be a suitable substitute for the tin-lead alloy with respect to the sound quality.

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Modal Testing of a Caribbean Steel Drum

Steelpans are instruments which generate a large number of notes from a single membrane. In this work, modal testing was conducted on a soprano pan, obtaining resonant frequencies and mode shapes that provide a spatial illustration of modal tuning when using the instrument. A soprano pan was excited with a loudspeaker and its response recorded by a 3-D Scanning Vibrometer. The results reveal the nearly harmonic relationship among tuned modes in each outer note. There is also significant modal coupling between adjacent notes that have harmonically related frequencies.

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Full paper:
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